

Missouri **Plants** of Conservation Concern



Cover: Ozark corn salad (*Valerianella ozarkana*) growing with spider wort (*Tradescantia ernestiana*) in Barry Co., Mo.
Photo by Jim Rathert



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Acknowledgements

The compilation of the information and illustrations in this booklet relied on the works of numerous botanists, photographers and illustrators. Many of the illustrations without captions are from Steyermark's *Flora of Missouri* (1963) or Yatskievych's *Steyermark's Flora of Missouri, Revised ed. Vol. 1* (1999). The format was guided by the Missouri Department of Conservation's 1984 publication, *Select Rare & Endangered Plants of Missouri* by Sharon W. Morgan. I am indebted to the photographers and illustrators whose work makes this a more attractive and useful product. My thanks go to Dr. George Yatskievych of the Flora of Missouri Project for his review of the text and distribution maps. Thanks to Carol Davit for helping to organize the project and for editing the manuscript. Tracy Ritter's skills in the design of the booklet and in assuring the color accuracy of the photographs are much appreciated.

Tim Smith

Introduction

Missouri's flora has been documented at about 2,300 native plant species, varieties and subspecies. These range from common and abundant weeds to single plants that were last seen in the state over 100 years ago. Land use has increased habitat for some species and nearly eliminated it for others. The Missouri Department of Conservation's Natural History Division collects information on our rare and threatened plants—our plants of conservation concern—so that we can protect them and maintain the rich diversity of species within our borders.

This booklet contains illustrations, descriptions and distributions of 37 plants that occur or formerly occurred in Missouri. These plants are considered to be those at greatest risk throughout their ranges of the 553 plants on the *Missouri Species of Conservation Concern Checklist, June 1999*. They were selected for this booklet based on their status in Missouri and their global rank using a system devised by The Nature Conservancy to evaluate the rangewide condition of species and natural communities. A species' state and global ranks are periodically reevaluated as new information becomes available; these ranks are not included in this booklet. The *Missouri Species of Conservation Concern Checklist* is updated annually to reflect the current status of included species. Federal statuses, as of this publication date, are noted in the species' text under the **Causes for concern** heading. For the complete listing of Missouri species of conservation concern and an explanation

of state and global ranks, see the latest edition of the *Checklist*.

It may be obtained by contacting:

Natural History Division
Missouri Department of Conservation
P.O. Box 180
Jefferson City, MO 65102-0180

A goal of this publication is to describe the rarest or most threatened Missouri plant species in the hope that the dissemination of this information will lead to the location of additional sites for these plants. Data on known sites are used in planning protection efforts so that detrimental effects on species of conservation concern can be avoided or minimized.

For those readers who will not be searching for rare plants, it is hoped that this compilation will foster an appreciation of the diversity and beauty of Missouri's imperiled flora.

Some species in this booklet cannot be accurately identified without considerable expertise in the use of botanical references that are beyond the scope of this treatment. The resemblance of a species to a photograph or drawing is usually not sufficient for accurate identification. Many plant species in this booklet are closely related to more common Missouri species that cannot be differentiated on the basis of an illustration. The **Identifying characters** section for a species should be read carefully and understood before concluding that a plant in

question is indeed the rare species. The accurate identification of mosses and liverworts, in particular, requires a familiarity with specialized terminology and close examination of microscopic details. For these reasons, this booklet should not be a sole reference for plant identification. For more accurate identification of Missouri's flora, the following references should be consulted:

Yatskievych, G. 1999. Steyermark's Flora of Missouri, Revised ed. Vol. 1, Missouri Department of Conservation. Jefferson City, MO. xii, 991 pp.

Steyermark, J.A. 1963. Flora of Missouri. Iowa State University Press. Ames, IA. 1728 pp.

Conard, H.S. & P.L. Redfearn, Jr. 1979. How to know the mosses and liverworts, Wm. C. Brown Co. Publishers, Dubuque, IA. 302 pp.

If you believe that you have located a site for a plant described in this booklet, please contact us for verification and documentation. A form called the Missouri Rare Plant Reporting Form is included at the back of this publication for your use in submitting site records. A good photograph or a plant specimen is usually needed to confirm the identity of the plant. A specimen should not be collected, however, if it would reduce the number of plants at a site by more than 10 percent. You can help protect these rare species from further decline by informing us of any new sites where they occur.

How To Use This Book

Each species treatment contains a photograph or line drawing or both. Some plants are so rare that no photographs of them could be located.

Distribution is given for Missouri as well as rangewide. On the Missouri maps, extant (seen within the last 25 years) occurrences are indicated by yellow dots; historical (not seen for 25 years or longer) occurrences are indicated by blue triangles. On the United States maps, no attempt was made to distinguish between extant and historical occurrences. Larger green areas indicate several occurrences in relatively close proximity to each other. Any distribution beyond the lower 48 states is described in the **Causes for concern** section.

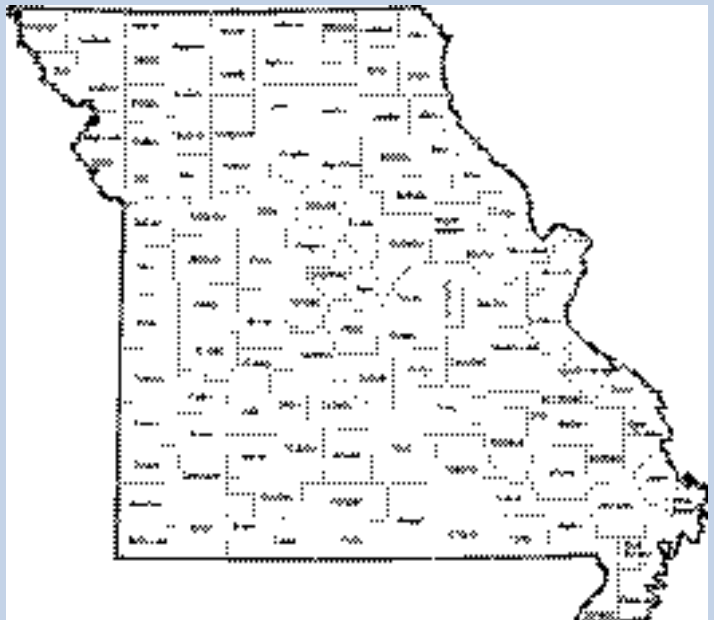
Scientific names (including the taxonomic authorities) and **common names** for vascular plants follow those used in *Steyermark's Flora of Missouri, vol. 1, Rev. ed.* by Yatskievych (1999) for the monocots and in *Catalogue of the Flora of Missouri* by Yatskievych and Turner (1990) for the dicots. For mosses, the taxonomic reference is *List of the Mosses of North America North of Mexico* by Anderson, Crum and Buck (1990) and for liverworts, *A Checklist of the Liverworts and Hornworts of North America* by Stotler and Crandall-Stotler (1977).

Flowering and fruiting dates are approximate for Missouri. They can vary as much as two to three weeks from one year to the next and between the southern and northern extremes of the state in a given year.

Habitat information is taken from a number of sources and often includes habitats documented from areas outside of Missouri.

Identifying characters are intended to describe the plant overall as well as give the key characteristics (in bold) that differentiate it from similar species. Species should be keyed in an appropriate plant manual for most accurate identification.

Causes for concern include any available information on rarity or decline. Additional range information beyond the limits of the distribution maps is included here along with any federal status as of this publication date.



County map reference

Auriculate false foxglove
Scrophulariaceae • Figwort family

Flowering dates:

Mid-August–
early October

Fruiting dates:

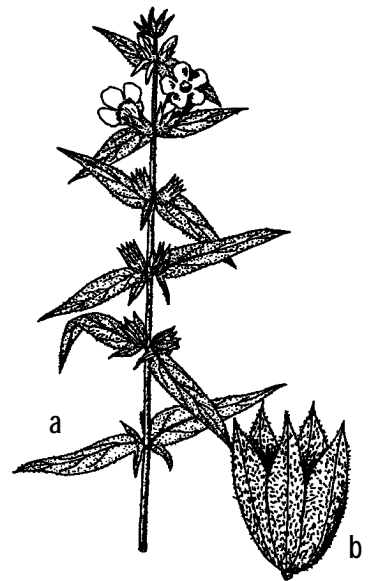
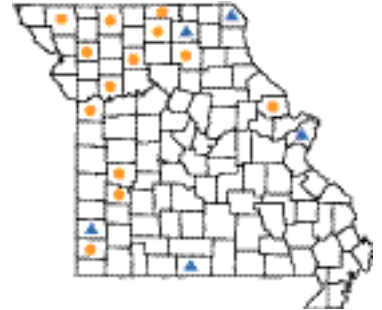
September–October

Habitat:

Prairies, old fields, old road beds and forest edges; often in dry areas that are somewhat open due to erosion, past grazing or other soil disturbance.

Identifying characters:

Rough-hairy annual



a. Flowering stem; b. Calyx



Pat Whalen

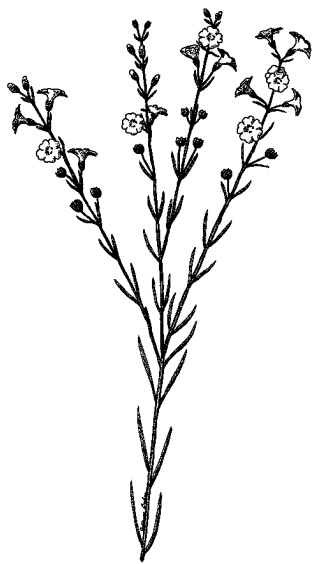
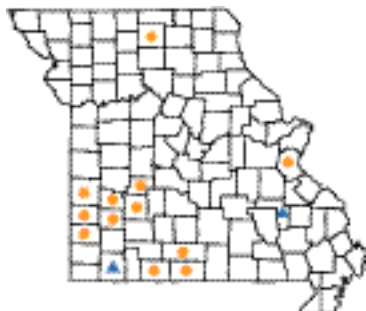
herb with a four-angled stem, up to 32 inches tall. **Hairs on stem downward-pointing.** Leaves nearly without stalks, lance-shaped or wider, up to $\frac{3}{4}$ inch broad and $2\frac{1}{4}$ inches long, the uppermost with small lobes (auricles) at their bases. Flowers along the stem in leaf axils, without stalks, $\frac{3}{4}$ inch long, bell-shaped with spreading lobes. Corollas tubular, rose-colored or pink, with purple spots in the throat. Fruit a capsule, $\frac{1}{2}$ inch long.

Causes for concern: Several states have only one or two known populations. The species occurs in scattered localities including a number of disturbed habitat types. A known site may not contain plants each year. Little is known of how to manage a site for this plant. Typical prairie management may harm the species if the timing of haying or burning prevents seed production.

Agalinis skinneriana (A.W. Wood) Britton

Pale gerardia

Scrophulariaceae • Figwort family



Drawing courtesy of Indiana Department of Natural Resources and Colleen Baker.

Flowering dates:

Late August–
early October

Fruiting dates:

Mid-September–
late October

Habitat:

Dry, upland areas of
sparse vegetation in
prairies and glades.
Soils range from acidic
to basic.

Identifying characters:

Herbaceous annual
with unbranched stems

or with a few upward-pointing branches. Stems up to 20 inches tall, **sharply angled, usually winged, with hairs on the angles giving a rough texture.** The opposite leaves lacking stalks are very narrow, **upward-pointing**, and up to $\frac{3}{4}$ inch long. Flowers from upper leaf axils have pink to white 5-lobed corollas. **Outer surface of the three lower corolla lobes are without hair.** Fruits are nearly spherical capsules containing numerous tiny seeds. Pale gerardia closely resembles two other *Agalinis* species that commonly occur in Missouri.

Causes for concern: In Missouri the species seems to be restricted to high quality prairies and glades, which are limited due to destruction of these habitats and succession to more wooded areas following suppression of fire. Little is known of the species' requirements for germination, pollination and other life history needs.



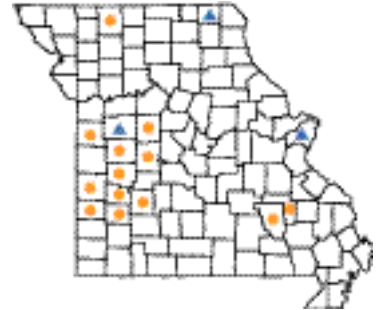
George Vaskewych

Mead's milkweed

Asclepiadaceae • Milkweed family



Jim Rathert



Flowering dates: Late May–mid-June

Fruiting dates: June–mid-September

Habitat: Dry-mesic and mesic upland prairies and igneous glades. Mead's milkweed usually occurs on pristine prairies and glades with a high diversity of native plants.

Identifying characters: Perennial rhizomatous herb to 2 feet tall with **2–6 pairs of opposite leaves without stalks**. Leaves tapering to tip, 1½–3½ inches long. Flowers occur in **one nodding cluster** at top of the stem with 5–14 yellow-green flowers that may be tinged with purple. Individual flowers have five tubular hood-shaped structures with a **slender horn** extending from each one. Fruits are slender pods up to 4 inches long that split down the sides to release seeds with a parachute-like cluster of attached hairs.

Causes for concern: Mead's milkweed is rare throughout its range and is listed as federally threatened by the U.S. Fish and Wildlife Service. The destruction and fragmentation of the once vast tallgrass prairie ecosystem has left many populations vulnerable due to poor seed production. Mid-summer haying eliminates the chance for seed production at many prairie sites. A significant recent decline has been observed at one Missouri prairie population.



Tim Smith

Aster furcatus Burgess

Forked aster

Asteraceae • Daisy family



BRI SUMMERS

Flowering dates: July–October

Fruiting dates: August–November

Habitat: Moist, rocky ledges and talus of north-facing dolomite bluffs along streams.

Identifying characters: Perennial herb 12–32 inches tall **growing in dense colonies from creeping rhizomes.** Usually **without basal leaves.** Lower leaves ovate, up to 6 inches long and 3 inches wide, with petioles, heart-shaped bases and toothed margins. Upper leaves smaller and sessile. Inflorescences flat- or round-topped, composed of flower heads with 9–18 white ray flowers. **One of our earliest blooming asters.**

Causes for concern: Populations are localized and dependent on a rare habitat. Many colonies are single individuals that do not produce seed due to the inability to self-pollinate. Genetic variation is extremely low throughout its range. Changes in water flow could eliminate necessary moisture at a site.



a. Upper stem with inflorescence; b. Lower leaf

American barberry

Berberidaceae • Barberry family

Tim Smith



Flowering dates: May

Fruiting dates: June–July

Habitat: Rocky woodlands, open woodlands and upper ledges of north-facing dolomite or sandstone cliffs along streams.

Identifying characters: Sparsely branched shrub up to 6 feet tall, **bearing 3 spines at the base of each leaf cluster**. Leaves up to 2½ inches long, broadest above the middle, **with edges spiny-toothed and wavy**. Two-year-old twigs are purple, orange or reddish brown. Flowers yellow, in 5–10-flowered clusters, on stalks arising from the leaf clusters. Fruits are **one-seeded red berries** about ¾ inch long.

Causes for concern: Restricted to a rare habitat in Missouri: north-facing cliffs along the Jack's Fork and Eleven Point rivers. This shrub requires a somewhat open habitat and may have become restricted to cliffs by the canopy closure of forests once kept open by periodic fires. Grazing may be harmful to the species. In eastern parts of its range, this plant was killed because it and other barberries serve as an alternate host for black stem rust, a disease affecting grain crops.



a. Branch with fruit; b. Flower

Decurrent false aster
Asteraceae • Daisy family



Don Kutz

Flowering dates: July–October

Fruiting dates: August–October

Habitat: Low areas subject to flooding by the Mississippi River: ditches, mudflats, sloughs and agricultural fields. Requires periodic disturbance such as prolonged standing water.

Identifying characters: Coarse perennial plant, 1–5 feet tall or taller. Leaves broadly linear; lower leaves broader and larger, 3–6 inches long. Most **leaves with decurrent wings** down stem (leaf blade tissue attached to stem and extending as narrow wings below point of leaf attachment). Inflorescence branched, with scattered small leaves. Flower heads $\frac{3}{4}$ –1 inch in diameter, yellow disk flowers, white to purple ray flowers.

Causes for concern: The current Missouri distribution of this federally threatened species is limited to the eastern half of St. Charles County. Decurrent false aster succumbs to shading from competing plants if not periodically disturbed. Roadside populations are subject to mowing during the growing season, which prevents seed production.



Jim Rathert



Flowering dates:

July–September

Fruiting dates:

August–November

Habitat:

Usually found on north-facing bluff tops and ledges on acidic substrates in shade or partial sun.

Identifying characters:

Rhizomatous perennial forming **loose colonies of scattered tufts**. Flowering stems

up to a meter tall but colonies frequently contain no flowering stems. Leaf blades up to 16 inches long and ½ inch wide, **bluish green and glaucous on both sides**. Seedheads with ascending branches and up to 12 inches long. Florets with basal tuft of hairs **about half as long as the lemma**. Glumes ⅛–¼ inch long, narrowly ovate. **Awn attached to lemma toward base of midnerve, abruptly twisted and bent near the middle.**

Causes for concern: Largely restricted to bluffs and ledges; many Missouri populations occur along and in the vicinity of the Ozark National Scenic Riverways. Most colonies contain only vegetative plants; flowering is uncommon and sporadic. Flowering plants have been found to fail to produce mature fruits. Effective management techniques to improve seed production are not known.

Offer Hollow reedgrass

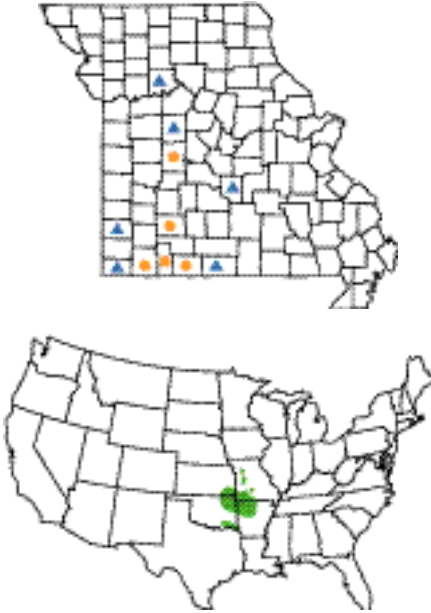
Poaceae • Grass family



a. Growth form; b. Spikelet; c. Glumes; d. Floret

Callirhoe bushii Fern.

Bush's poppy mallow
Malvaceae • Mallow family



Flowering dates:

May–August

Fruiting dates:

May–September

Habitat:

Borders of glades; rocky, open woods; wooded valleys; ravine bottoms; and roadsides and railroad rights-of-way. Usually associated with shrubs in calcareous, rocky soils that are deeper than those of open glades.



Don Kutz

Identifying characters: Herbaceous perennial with **ascending or erect stems** up to 1½ feet tall, with hairs on leaves and especially on the upper half of stems. **Stems not glaucous.** Leaves broader than long, 2–5 inches wide, **deeply lobed into 5–7 broad sections.** Upper leaves smaller, often 3-lobed. Flowers solitary, on stalks to 4½ inches long, arising from the leaf axils, with 5 deep rose-purple petals. Calyx 5-lobed and with **3 smaller bractlets at the base of or on the outside of the calyx.** Fruits of 10–20 single-seeded carpels.

Causes for concern: Only 18 extant sites are known in five Missouri counties. Railroad and roadside right-of-way sites are subject to destruction from mowing, grading, herbicide application and other threats. Little is known of appropriate management for this species. Nursery-grown plants are available from native plant nurseries for use in home landscaping.



Flowering dates:

July–August

Fruiting dates:

August–October

Habitat:

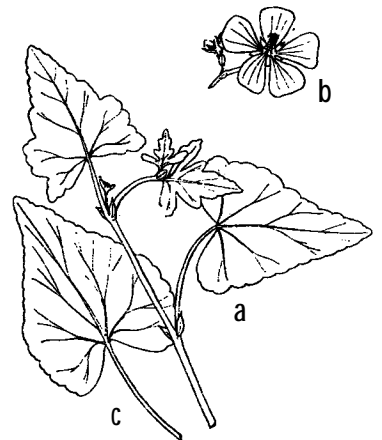
Sand prairies; sandy open ground; rocky open woods; and acid glades.

Identifying characters:

Herbaceous perennial with nearly erect stems up to 2–3 feet tall. **Stems, leaves and calyxes densely hairy with star-shaped hairs.** Leaves triangular and toothed but **lower ones without deep lobes or divisions.** Flowers deep rose-purple on short stalks with 5 petals, each up to 1 inch long. **Sections of multi-sectioned fruits not wrinkled.**

Causes for concern: Known historically from two Missouri locations, clustered poppy mallow was last documented in the state in 1933. Sand prairie habitat is rare today in southeastern Missouri; much has been altered through agricultural activities. This species is considered rare or extirpated in most of the states from which it has been reported.

Clustered poppy mallow
Malvaceae • Mallow family



a. Leafy upper stem; b. Flower; c. Lower leaf

Carex decomposita Muhl.

Epiphytic sedge

Cyperaceae • Sedge family



Tim Smith



Tim Smith

Flowering dates: May–July

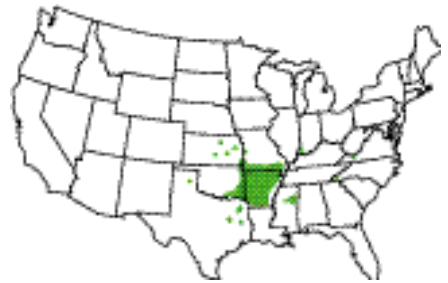
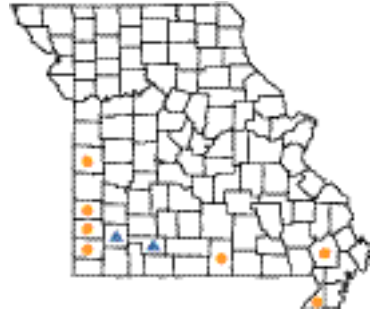
Fruiting dates: June–November

Habitat: Sinkhole ponds, where it typically grows from the bases of buttonbush (*Cephalanthus occidentalis*) shrubs around pond margins or on floating vegetation mats.

Identifying characters: Herbaceous perennial **growing in dense clumps** formed mostly of basal leaves up to 28 inches long. Flowering stems without hair, up to 3 feet tall, bluntly 3-sided, and dark brown or black at the base. **Branched inflorescence** with flowers in dense spikes clustered along the branches, **lower branches well developed**. Fruits less than $\frac{1}{16}$ inch long, two-sided, somewhat flattened, enclosed in **perigynia that are broadest near the tip**.

Causes for concern: Historically, sinkhole ponds have been lost to draining or have been degraded by grazing. Lowered water table levels can dry out formerly suitable habitats. Overall range of the species has been reduced in the last century, particularly in the northern and eastern states.

Oklahoma sedge
Cyperaceae • Sedge family



Jim Rathert

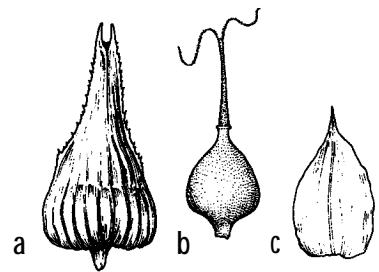
Flowering dates: May–July

Fruiting dates: June–August

Habitat: Bottomland prairies, moist swales of upland prairies, fens, sloughs, pond and stream margins, ditches and along railroad rights-of-way.

Identifying characters: Densely tufted herbaceous perennial. Flowering stems up to 32 inches tall, **bluntly 3-sided toward the base but sharply 3-sided and not winged toward the tip.** **Stems firm and not easily crushed.** Leaf blades to 16 inches long and $\frac{3}{16}$ inches wide. Dorsal side of leaf sheaths light green to white with dark green cross-lines, ligule U-shaped and wider than long. Inflorescences branched, with numerous spikes having male flowers toward the tip, not evidently distinct from female flowers toward the base. **Pistillate scales light brown to brown at maturity.** Perigynia $\frac{3}{16}$ inch long, with 5–7 faint nerves on ventral surface, 9–12 strong nerves dorsally. Base of the biconvex achene thickened with spongy tissue that does not fill the base of the perigynium.

Causes for concern: Scattered throughout its limited range. Subject to loss of habitat by drainage or other modification of many types of wetlands.



a. Perigynia; b. Achene; c. Pistillate scale

Castanea pumila (L.) Miller var. *ozarkensis* (Ashe) G. Tucker

Ozark chinquapin

Fagaceae • Oak family



Don Kuiz

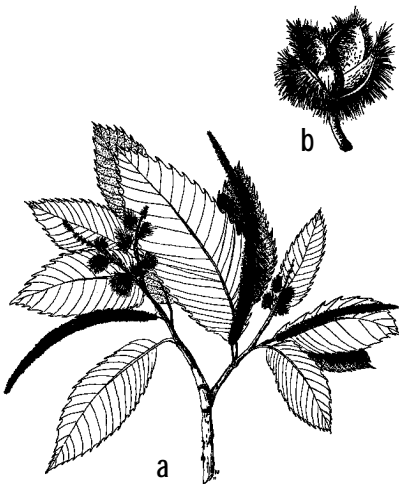
Flowering dates: Late May–June

Fruiting dates: June–September

Habitat: Cherty ridgetops and upper slopes of dry and dry-mesic oak-hickory forests; in acid soils. Flowering trees usually occur in edge habitats.

Identifying characters: Formerly a small tree growing up to 60 feet tall. Now **typically seen as sprouts from old stumps and clusters of dead stems** due to infection by chestnut blight. **Leaves are coarsely but sharply toothed**; up to about 10 inches long and 2 inches wide; at maturity **with lower surfaces covered with minute, star-shaped, cream-colored hairs**. Male flowers occur in slender, erect spikes up to 8 inches long. Female flowers are less conspicuous, occurring below the male flowers of some spikes or in shorter, all-female spikes. **Fruits are clusters of usually 5–7 burs with finely hairy branched spines**. Each bur splits into 2–4 segments to release a **single edible nut**.

Causes for concern: This tree has a small range and is subject to repeated killing of stems by chestnut blight. The sites mapped in Alabama may no longer contain living trees. It is not known how long the trees' root systems can continue to resprout and grow new stems.



a. Flowering branch; b. Fruit with nut

An umbrella sedge
Cyperaceae • Sedge family



Paul McVernie



Flowering dates: June–July

Fruiting dates: July–September

Habitat: Sand prairies and dry, sandy soils of fallow fields and other disturbed areas.

Identifying characters: Herbaceous perennial with bluntly 3-sided, **smooth** stems to 2 feet tall. Leaves are about 1/8 inch wide and up to 14 inches long. **Somewhat flattened spikelets** are without stalks along central axes that occur in headlike clusters. One or 2 clusters are not stalked but 3–7 clusters are at the ends of smooth stalks. **Four to 7 leaflike, spreading bracts** **originate at the top of the stem, below the inflorescence.** **Spikelet scales barely overlap adjacent scales on the same side of the axis.** Fruits are about 1/8 inch long, are **distinctly 3-sided**, shiny and have a finely roughened surface.

Causes for concern: Most sand prairie habitat in southeastern Missouri has been lost to agricultural land use, and no sand prairies are currently protected by public ownership. Existing remnant habitats are subject to herbicide application or conversion to agriculture or development.



Inflorescence

Delphinium exaltatum Aiton

Tall larkspur

Ranunculaceae • Buttercup family



Upper stem and inflorescence

Flowering dates:

July–August

Fruiting dates:

August–September

Habitat:

Somewhat open forests of north- or west-facing slopes with dolomite or cherty dolomite substrates, usually near rivers. Sometimes associated with small glade openings or talus.

Identifying characters:

Herbaceous perennial 2–6 feet tall. Alternate leaves palmately divided with 5 major divisions that are **broad (up to 1 inch wide) and wedge-shaped**, with fine short hairs. Eight to 30 flowers are whitish lavender to purple, with spurs to ½ inch long, borne at the top of the stem. **Stalks of lower flowers and fruits up to 1 inch long.** Fruits finely hairy, ½ inch long, usually of 3 follicles.

Causes for concern: Restricted in Missouri to 12 sites in two counties. Threats to the species include the succession of open forests to densely shaded forests, grazing, off-road vehicle use and the encroachment of sites by aggressive exotic plant species. Nursey-grown plants are available from native plant nurseries for use in home landscaping.



Don Kurz

Flowering dates: July–September

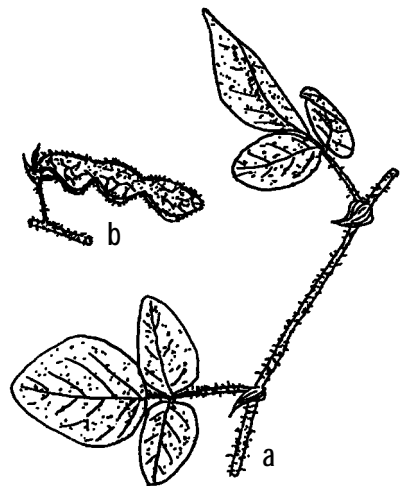
Fruiting dates: August–October

Habitat: Sandy or rocky soil of woodlands, open areas, roadsides.

Identifying characters: **Sprawling** perennial herb with **hairy, branched stems** to 39 inches long. Leaves, on petioles up to 5 inches long, are compound with three ovate leaflets that are hairy or nearly hairless. Pealike **flowers are yellowish white** on stalks up to $\frac{3}{4}$ inch long in inflorescences along stem and at stem tips. Fruits are “beggar’s lice” with 2–4 sections that are **up to $\frac{3}{8}$ inch long and nearly hairless except along the edges.**

Causes for concern: Historically known from only three Missouri counties, not reported since 1930. Missouri habitat probably diminished by conversion of southeastern sand savannas to agricultural uses. Rare throughout its range.

Creamflower tick trefoil
Fabaceae • Bean family



a. Portion of stem and leaves; b. Fruit

Dodecatheon frenchii (Vasey) Rydb.

French's shooting star

Primulaceae • Primrose family



Flowering dates:

Late April–June

Fruiting dates:

June–September

Habitat:

Moist, shaded sandstone cliffs within forests, often on ledges, overhangs, or at base of cliffs. Frequently on bare soil with little competition from other plants.

Identifying characters:

Perennial herb with basal leaves and a leafless flowering stem. Leaves ovate, **broad-based and abruptly tapered to the petiole**, up to 10 inches long, hairless. Flowering stem up to 12 inches tall with a few white or pink stalked flowers clustered at the top. Lobes of petals bent backwards. Fruits are cylindric capsules up to $\frac{3}{8}$ inch long with **firm, woody walls**.

Causes for concern: Threats to the species include removal of the forest canopy by logging, digging around rock shelters for archeological artifacts, off-road vehicle use, disturbance from rock climbing and excessive trampling by deer. The Missouri sites for French's shooting star are in only one small region of Ste. Genevieve County.



DonKurtz



George Vachek

Flowering dates:
July–September

Fruiting dates:
August–October

Habitat: This species colonizes the sandy or rocky shorelines of natural sinkhole ponds and artificial ponds with fluctuating water levels.

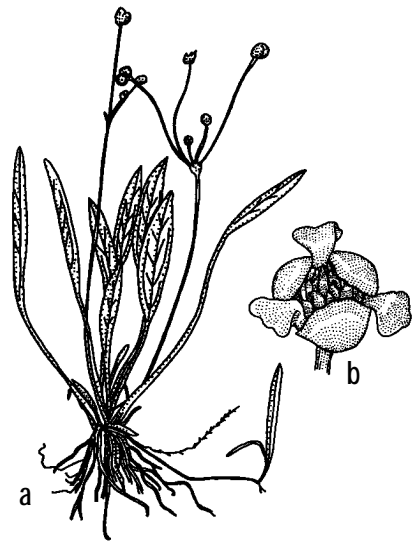
Identifying characters:
Small herbaceous perennials up to 4 inches tall, with stolons. Stalked

leaves linear or narrowly elliptic, up to 4 inches long. Three to 6 flowers in each of 1 or 2 whorls at the ends of unbranched flower stalks. Flowers with 3 white to pinkish white petals up to 1/8 inch long and 3 green, shorter sepals. **Stamen filaments attached at the base of the anthers.** Fruits plump, reddish brown, with 8 ribs and an obliquely attached minute tooth forming a beak.

Causes for concern: Currently known from only four Missouri sites; dwarf burhead is rare throughout its range. In addition to the U.S. populations, this variety is known from Cuba and Vera Cruz, Mexico. Its populations can fluctuate dramatically from year to year and rely on changing water table levels for suitable habitat. Suitable habitats are subject to loss through drainage alteration in shallow wetlands. Dwarf burhead is often associated with the rare plant, Hall's bulrush (*Schoenoplectus hallii*) (see p. 41).

Dwarf burhead

Alismataceae • Water plantain family



a. Habit; b. Flower

Wild rye

Poaceae • Grass family

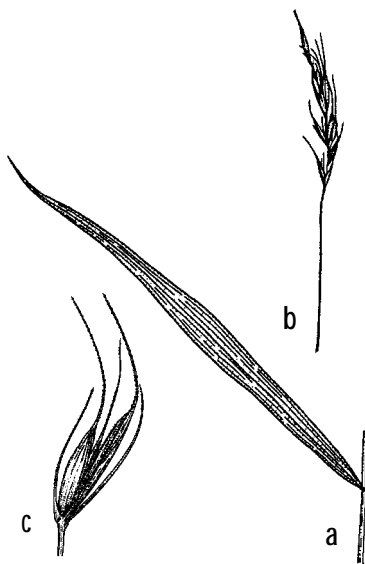
Flowering dates: June–August

Fruiting dates: July–November

Habitat: Upland prairies and dry, rocky slopes of upland forests.

Identifying characters: Herbaceous perennial forming tufts, but **without rhizomes**. Flowering stems without hair, somewhat glaucous and up to 5 feet tall. Leaf blades up to 16 inches long and $\frac{5}{8}$ inch wide, with hairs on the upper surface. Inflorescence up to 10 inches long, arched or nodding **with clusters of mostly 2 spikelets per node**. **Spikelets erect or strongly ascending. Lemmas hairy with at least some of the awns bent or arching outward.** Axis of inflorescence flattened, **not breaking into segments at maturity**.

Causes for concern: This species has not been verified as occurring in Missouri since 1957 and was probably always rare in the state.



a. Leaf; b. Inflorescence; c. Cluster of spikelets

Geocarpon

Caryophyllaceae • Pink family



Richard Thom

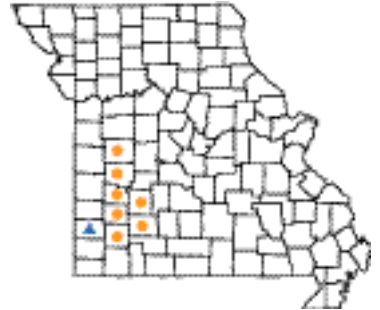
Flowering dates: April–May

Fruiting dates: May–early June

Habitat: Pennsylvanian-aged sandstone glades and outcrops. *Geocarpon* grows with few other plants in shallow, sandy, often pebbly soil in bedrock depressions and in the thin soil at the edges of the exposed sandstone.

Identifying characters: Tiny succulent winter annual to 1½ inches tall. Plants may be well branched or have single, unbranched stems. Leaves are opposite and sessile. Flowers are inconspicuous, green and lack petals. Young plants pale green, becoming wine-red with age. Fruits are capsules with numerous, minute, honey-colored seeds.

Causes for concern: *Geocarpon*'s life history is poorly known as are its management needs. Many populations are small and occupy only a fraction of what appears to be suitable habitat. Habitat may undergo succession to denser vegetation without periodic disturbance. The species is listed by the U.S. Fish and Wildlife Service as federally threatened.



Homaliadelphus sharpii (Williams) Sharp

Sharp's homaliadelphus

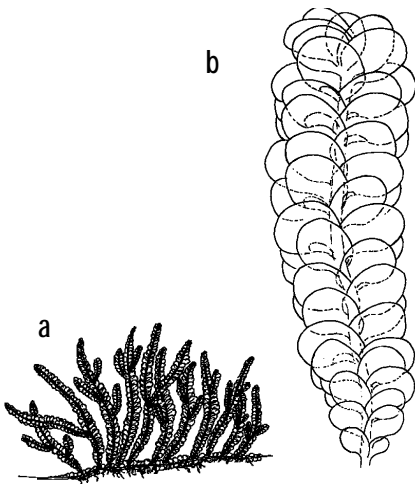
Neckeraceae • a moss family



Habitat: On vertical rock faces and ledges of dry dolomite cliffs or boulders.

Identifying characters: Plants in glossy, flat, green or yellowish green mats, attached to substrate by clusters of red-brown threadlike radicles. Branches densely leafy and flattened with ovate leaves with small basal lobes clasping the stem. Costa (resembling a midrib in vascular plant leaves) absent or short and double. Sporophytes (spore-producing structures) are not known for this moss.

Causes for concern: Little is known about the needs of or threats to this rare moss. The lack of observations of sporophytes may indicate that this moss has a poor ability to disperse. In addition to the distribution shown, the species is known from Mexico (Chiapas), Japan and Vietnam. Because many areas have been poorly surveyed for mosses, the total range of the species is not known.



a. Habit; b. Leafy branch
From *Mosses of Eastern North America, Vol. 2*
by Howard A. Crum and Lewis E. Anderson. 1981.
Columbia University Press. Reprinted with the
permission of the publisher.

Creeping St. John's-wort
Clusiaceae • St. John's-wort family

Flowering dates:
July–early September

Fruiting dates:
August–October

Habitat:
Moist swales of sand prairies, pond margins, marshes and wet ditches; sometimes growing in standing water.

Identifying characters:
Stout, tall, rhizomatous perennial herb growing up to 2½–3



Tim Smith

feet tall. Lower leaves elliptic, becoming lance-shaped above, up to 3 inches long and up to $\frac{3}{8}$ inch wide, with clasping bases. **Leaf blades rolled under at the edges.** Many-flowered, branched inflorescences at top of stem; flowers with 5 sepals and 5 yellow petals about $\frac{1}{4}$ inch long. Fruit an ellipsoid capsule, $\frac{3}{16}$ inch long.

Causes for concern: Only one known extant Missouri site for this species exists: a moist swale in a Scott County sand prairie remnant. This plant has probably always been restricted to the southeastern part of the state. There is little open natural land remaining in this region to provide habitat for the species. The primary threat is that remaining habitat might be lost to development or farming operations.

Isotria medeoloides (Pursh) Raf.

Small whorled pogonia
Orchidaceae • Orchid family



Flowering dates: May

Fruiting dates:
June–October

Habitat:

The historical Missouri site was described as a wooded limestone hill. In New England, where most plants occur today, habitats are highly acidic soils on east-facing forested slopes.

Identifying characters:

Perennial herb to 12 inches tall, growing in small colonies. Stems have a **whorl of 4–6 drooping leaves** that are up to 2½ inches long. One or 2 greenish yellow flowers about 1 inch long occur above the leaves at the top of the stem. **Sepals are green and ½–1 inch long.** Fruit is an erect capsule about an inch long on a stalk of similar length.



John Schweegman

Causes for concern: This federally threatened orchid has not been documented in Missouri since 1897 when it was found in Bollinger County. A number of more recent surveys in the historical locality have failed to relocate it. This orchid is rare throughout most of its range; most plants occur in Maine and New Hampshire.



Flower stalk and flower

Corkwood

Leitneriaceae • Corkwood family

Jim Rathert



Flowering dates: March–early April

Fruiting dates: Late April–August

Habitat: Near ponded water of swamps, marshes, wet bottom-land forests and wet ditches; in full sun or partial shade.

Identifying characters: Shrub 2–7 feet tall **forming thickets by root suckers**. Alternate leaves are clustered near the top of the new season's growth and have blades up to 8 inches long. Young leaves are soft-hairy, especially on the lower surface, later becoming somewhat leathery. **Flowers appear before the leaves, are typically staminate or pistillate on a single plant, are without sepals or petals, and are borne at the tops of stems or branches.** Fruits on pistillate plants are leathery drupes up to an inch long, often in clusters.

Causes for concern: Corkwood persists in southeastern Missouri in remnant wetlands and along man-made ditches where it is threatened by ditch maintenance and herbicide run-off. Plants may be lost to dense shading by a forest canopy.



a. Growth form with fruit; b. Male catkins;
c. Female catkins

Lesquerella filiformis Rollins

Missouri bladderpod

Brassicaceae • Mustard family



Flowering stems with immature fruits



Jim Rathert

Flowering dates: April–May

Fruiting dates: May–early June

Habitat: Limestone glades or limestone outcrops in pastures, lawns, utility corridors or roadsides. Often associated with eastern red cedar on sites not managed with fire or currently grazed.

Identifying characters: Winter annual, 4–8 inches tall with one to numerous slender, wiry stems. Stems and leaves appear silver-gray due to dense covering of fine **star-shaped clustered hairs**. Showy, $\frac{1}{4}$ – $\frac{3}{8}$ inch-long, bright yellow flowers on stalks at tops of stems and stem branches. **Fruits spherical**, green becoming tan and hollow at maturity.

Causes for concern: Most of the world's population of this federally endangered species occurs in four Missouri counties. Succession of undisturbed sites to eastern red cedar and other woody plants eliminates habitat. The species may be eliminated or reduced when suitable habitats are invaded by aggressive exotic plants such as downy brome, Japanese brome and musk thistle.

Lindera melissifolia (Walter) Blume

Pondberry

Lauraceae • Avocado family

Jim Rathert



Flowering dates:

March–early April

Fruiting dates:

June–early October

Habitat: Sandy, swampy depressions in bottomland forests of southeastern Ripley County that are subject to inundation during wet periods.



Identifying characters: **Aromatic** shrub 3–5 feet tall, **forming thickets**. Plants are staminate or pistillate. Leaves slightly drooping, **rounded at base**. Young stems are hairy. Flowers small, yellow, borne in clusters along stem and appear before the leaves. Fruits glossy, bright red when mature, ½ inch long, with a single seed.

Causes for concern: The Missouri distribution of this federally endangered plant is restricted to a few square miles. Changes to the local water table or water quality could eliminate the population. Seedling establishment is apparently rare; colonies spread through vegetative reproduction. Much habitat was lost through past land clearing and draining for agriculture. Thirty-seven populations are known rangewide.



Virginia Malace

Twig with pistillate flowers

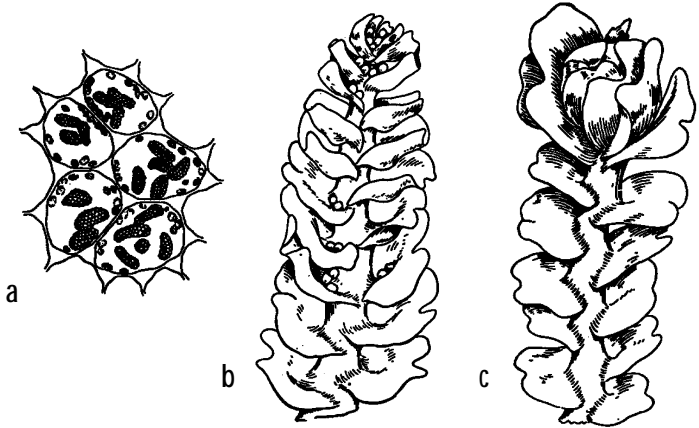
Nardia lescurii (Aust.) Underw.

A Liverwort

Jungermanniaceae •
a liverwort family



Note: U.S. distribution outside of Missouri is shown only at the scale of states with known sites, due to lack of available county information.



a. Median leaf cells with oil-bodies; b. Tip of male shoot; c. Tip of female shoot
Drawings by Mary S. Taylor. From *The Bryologist* 42:91 (1939).

Habitat: Sprawling on damp loamy soil, humus or rocks; occurs in gorges in the eastern U.S. Usually associated with water at low elevations in mountains. Missouri sites are on vertical sandstone walls of shaded bluffs and canyons.

Identifying characters: Plants thick and fleshy, bright green in shade to purplish or rose-red on exposed sites. Leafy stems up to $\frac{1}{16}$ inch wide and $1\frac{1}{2}$ inches long, with little branching. **Leaves shallowly 2-lobed**, wider than long, overlapping like shingles on a roof. **Lobules absent, small lance-shaped underleaves present throughout.** Rhizoids scattered along lower stem surface.

Causes for concern: In Missouri, known from only two collections from the 1960s, both of which were sterile plants. The species is documented from Newfoundland in addition to the U.S. distribution above, which is largely Appalachian.

Alabama snow wreath

Rosaceae • Rose family

Flowering dates:

Late April

Fruiting dates:

May–August

Habitat:

Dry, rocky, forested slopes around sink-holes or along streams with sandstone or limestone substrates; under a partially closed or somewhat open forest canopy.

Identifying characters:

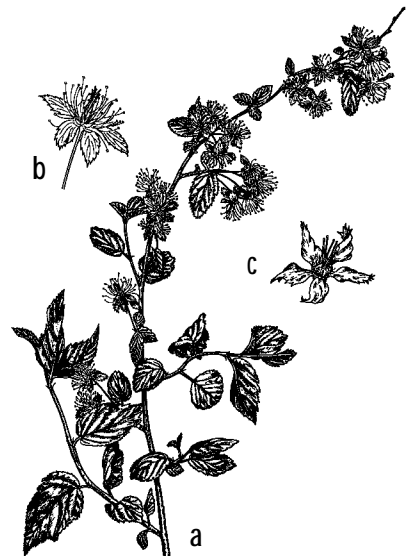
Shrub 3–6 feet tall



Art Christ

with slender stems, growing in colonies and spreading by rhizomes. Leaves thin, **doubly toothed, remaining green until late November**. Flowers clustered at tip of current season's growth and appear as the leaves expand. **Flowers are without petals, but with leafy green sepals and showy clusters of white stamens.**

Causes for concern: Only one record exists of this plant naturally occurring in Missouri—a botanist's collection from Butler County made in 1918. Although rare throughout its range, the presence of several populations in the northern half of Arkansas gives hope that the species may one day be relocated in southern Missouri.

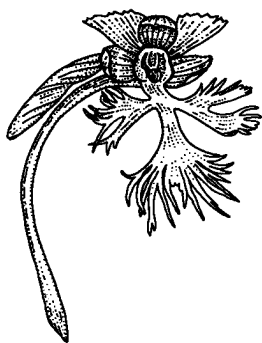


a. Growth form with flowers; b. Flower; c. Fruit cluster

Platanthera leucophaea (Nutt.) Lindley

Eastern prairie fringed orchid

Orchidaceae • Orchid family



Flower

Flowering dates:

Mid-June–early July

Fruiting dates:

July–August

Habitat:

Mesic or wet areas of prairies and fens, in calcareous or circumneutral soils.

Identifying characters:

Perennial plant **up to 4 feet tall**, without hair.

As many as six lance-shaped lower leaves are up to 8 inches long and

up to 1¾ inches wide; upper leaves are reduced in size. Flowers are white with green sepals and occur at the top of the stems in inflorescences up to 8 inches long. **The lower petal, or lip, is three-lobed and deeply fringed.** A long (up to 2 inches), arching nectar spur protrudes from the back of each flower. Very similar to the western prairie fringed orchid, differing primarily in the size and structure of the column (the central part of the flower).

Causes for concern: This federally threatened species was last documented to occur in Missouri in 1951. Botanists in recent decades have searched the historical location without success. The loss of prairie habitat in northeastern Missouri and the general loss of wetlands surely contributed to the decline of this orchid.



John Schweegman

Western prairie fringed orchid
Orchidaceae • Orchid family

Jim Rathert



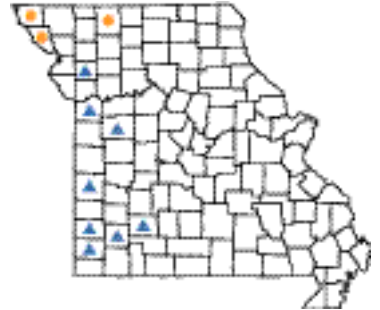
Flowering dates: Mid-June–early July

Fruiting dates: July–August

Habitat: Mesic upland prairies or swales of dry-mesic upland prairies.

Identifying characters: Perennial plant up to about **3 feet tall**, without hair. As many as five lance-shaped lower leaves are up to 10 inches long and up to 2 inches wide; upper leaves are reduced in size. Flowers are creamy white or greenish white and occur at the top of the stems in inflorescences up to 9 inches long. **The lower petal, or lip, is 3-lobed and deeply fringed.** A long (up to 2 inches), arching nectar spur protrudes from the back of each flower. Very similar to the eastern prairie fringed orchid, differing primarily in the size and structure of the column (the central part of the flower).

Causes for concern: Only three extant sites for this federally threatened orchid are known in Missouri. The loss of most prairie habitat from northern Missouri and from the Osage Plains contributed to its decline. The genetic isolation of remaining populations may affect the species' long-term viability.



Jim Rathert

Polymnia laevigata Beadle

Smooth leaf cup

Asteraceae • Daisy family



K/ State Nature Preserves Commission

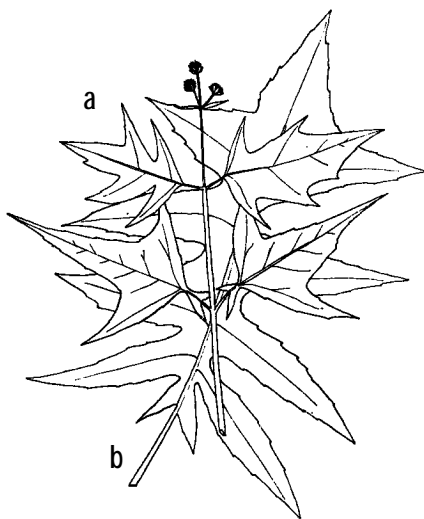
Flowering dates: July–October

Fruiting dates: August–November

Habitat: Mesic forests in light to dense shade, associated with limestone bedrock or loess or alluvial soils. Usually under a mixed canopy and with a mesic herbaceous groundcover.

Identifying characters: Herbaceous plant from overwintering rosettes, **stems reaching a height of up to 7 feet tall**, branching in the upper half. Leaves opposite, lower ones and those of rosettes withering by flowering time. Largest leaves up to 12 inches long with stalks up to half of this length. **Leaves deeply lobed** to unlobed with those of the ultimate branches the smallest and having the least lobing. **Stems and leaves essentially hairless**. Flowers in small, short-stalked heads with 5 or fewer white rays and about 15 yellow disc flowers. Fruits about 1/8 inch long **with 4–6 ribs**. The species can occur in **dense stands** with prolific reproduction.

Causes for concern: The species is rare throughout its range and was last seen in Missouri in 1956. Little is known of its habitat requirements or its life history. Logging and grazing appear to be the primary threats at known locations.



a. Stem and inflorescence; b. Lower leaf

Torrey mountain mint
Lamiaceae • Mint family

Flowering dates:
Late June–October

Fruiting dates:
July–November

Habitat:
Dry acid sites in forest openings and forest and glade edges.

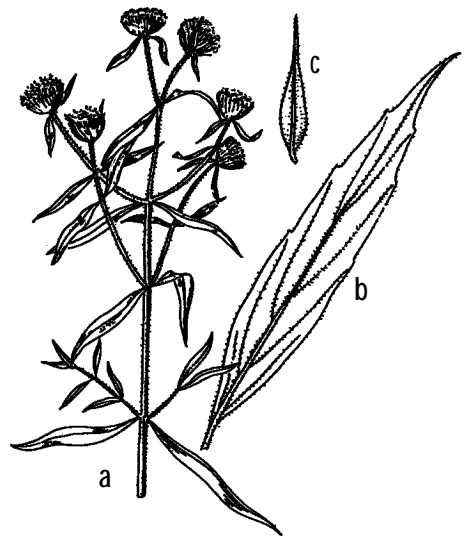
Identifying characters:
Perennial herbaceous plant with slender stems growing to a height of 1–2½ feet. Stems square in cross-section. Leaves up to 3 inches long are lance-



R. Harbison/Wiegand

shaped or linear, have serrate or smooth margins and short or no petioles. **Lower surfaces of leaves have little or no hair.** Flower clusters occur at the tip of the stem and upper stem branches. **Lobes of calyx about 1/16 inch long. Outermost leaflike bracts at base of flower clusters are hairless on upper surface and are not whitened.**

Causes for concern: The species has not been seen in Missouri since it was collected in Dunklin County by a botanist in 1892. Although formerly widely distributed in the eastern half of the United States, it is considered extirpated or of conservation concern in nearly every state from which it has been reported.



a. Flowering upper stem; b. Leaf; c. Involucre bract
Drawing by Lucille E. Kopp. Reprinted with the permission of The New York Botanical Garden.

Sagittaria ambigua J.G. Smith

Kansas arrowhead

Alismataceae • Water plantain family

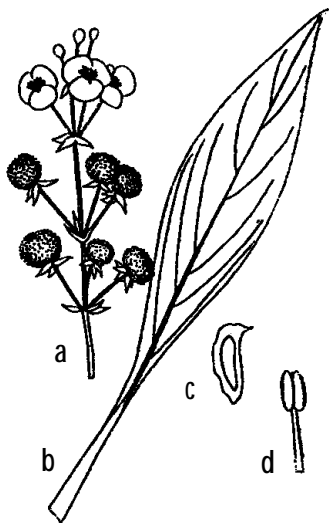
Flowering dates: June–August

Fruiting dates: July–September

Habitat: Edges of ponds, sloughs and ditches; mostly in prairie regions.

Identifying characters: Emergent herbaceous perennial with rhizomes. Leaves up to 22 inches long, lance-shaped, **without lobes at base (not arrowhead-shaped)**, the petioles up to twice the length of the blade. Flowers in round clusters that are stalked, with a narrow bract up to 1 inch long at the base of each flower stalk; the lower whorls with female flowers and the upper with male. Petals 3, white, slightly longer than sepals; **anther filaments without hair, sepals turned downward in fruit**. Fruiting heads less than $\frac{3}{8}$ inch across.

Causes for concern: Kansas arrowhead is uncommon throughout its narrow range. The species is known from only two Missouri counties; only one extant record is known. It would be threatened by the drainage of any wetland sites where it occurs and also by livestock trampling at grazed sites.



a. Inflorescence; b. Leaf; c. fruit; d. Stamen

Lower right photo: George Vobleyevich. Right photo: Tim Smith.



Flowering dates: July–August

Fruiting dates: August–September

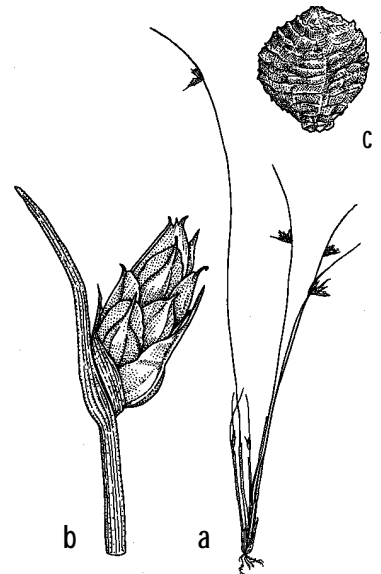
Habitat: Edges of sinkhole ponds and sandy depressions with fluctuating water levels that help keep the moist banks free of competing vegetation.



Identifying characters: A slender, annual plant with several stems growing in a tuft with short leaf blades near the base. Plants are up to 14 inches tall, terminating in an involucre leaf nearly half as long as the stem. One to 7 ovoid-cylindric, green and brown spikelets occur in a cluster at the top of the stem where the involucre leaf originates. **Fruits are transversely ridged black achenes, convex on one side** and about $\frac{1}{16}$ inch long.

Causes for concern: Only four Missouri sites from two southern counties are known. The species is rare rangewide, occurring in suitable wetland habitat that is typically disjunct from the next nearest suitable site. The alteration or destruction of its wetland habitat is the greatest current threat to the species. Hydrologic changes at a site could easily eliminate the conditions that allow it to sustain Hall's bulrush.

Hall's bulrush
Cyperaceae • Sedge family



a. Habit; b. Inflorescence; c. Fruit

Ozark spiderwort

Commelinaceae • Spiderwort family



Don Kutz

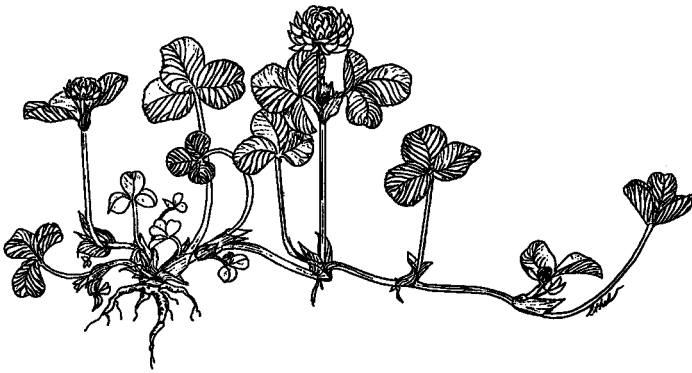
Flowering dates: April–May

Fruiting dates: April–July

Habitat: Moist upland forests on lower slopes of rocky ravines, moist ledges of bluffs, sinkholes. Associated with limestone or dolomite bedrock.

Identifying characters: Herbaceous perennial up to 20 inches tall, often with a pale white waxy coating on stems and leaves. Alternate leaves with sheaths clasping the stem; narrow blades up to 11 inches long, **tapering abruptly to the sheaths and distinctly broader than the sheaths**. Stalked flowers have three white, pink or lavender petals; three light green **sepals are covered with hairs, some of which are gland-tipped**. Fruits are oval capsules up to $\frac{5}{16}$ inch long, with 3–6 seeds.

Causes for concern: In Missouri, the species is known from only the White River Section of the Ozark Natural Division. Much habitat along the White River drainage was lost to large lake impoundments in the region that inundated lower slopes.



Flowering dates: Mid-April–June

Fruiting dates: June–July

Habitat: Moist, partially shaded woodlands, sometimes along stream or river terraces. Sometimes in areas disturbed by grazing or mowing that may suppress competing species. The species historically grew along bison trails, which often followed major streams and rivers.

Identifying characters: Stoloniferous perennial with erect flowering stems up to 16 inches tall. Stolons, or runners, root at the nodes allowing the plant to spread. Leaves have three leaflets that are finely serrate and **lack the pale markings** found on some common clovers. A **pair of leaves are arranged opposite-ly on the flower stalk below the flower head**. Large, persistent stipules up to 1 inch long are present where the leaf petioles join the stolon. Flower heads are nearly spherical and 1–1 $\frac{3}{8}$ inches in diameter with white flowers, rarely tinged with purple. Entire plant is **without hair**.

Causes for concern: Only three occurrences of the federally endangered running buffalo clover are currently known from Missouri and none are considered secure. The reason for the species decline since the early 1900s is not known, although it seems to have been linked to the earlier extirpation of bison in the state. Several exotic clover species that have become ubiquitous since settlement may out-compete running buffalo clover for habitat.

Running buffalo clover
Fabaceae • Bean family



Paul McKenra

Trillium pusillum Michx. var. *ozarkanum* (E.J. Palmer & Steyererm.) Steyererm.

Ozark wake robin

Liliaceae • Lily family



Tim Smith

Flowering dates: April–early May

Fruiting dates: May–mid-July

Habitat: Mesic to dry-mesic upland forested slopes, with cherty soils over calcareous substrates.

Identifying characters: Perennial herb up to 12 inches tall, with a single whorl of three leaves at the tip of the stem. **Leaves without stalks**, up to 3½ inches long, **two or more times longer than wide**, the tips usually rounded. Flowers single **at the top of an erect or ascending stalk** up to 1¼ inches long. Three green sepals are below three **white, pink, or purplish pink petals** up to 1½ inches long. Fruits are berries with three rounded lobes.

Causes for concern: Restricted to the Ozarks and the Ouachita Mountains, this wake robin is currently known in Missouri from only 16 sites in four counties. Several sites are at risk from development and from the spread of invasive exotic plants.

Ozark corn salad

Valerianaceae • Valerian family



Tim Smith

Flowering dates: April–May

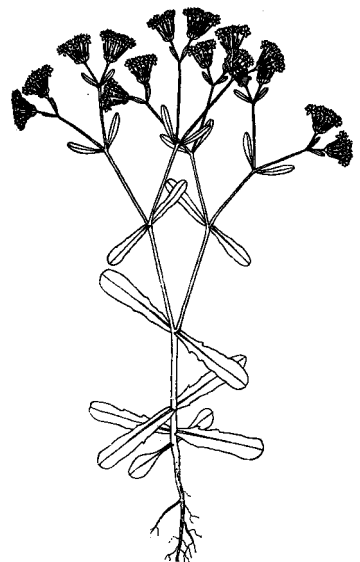
Fruiting dates: May–June

Habitat: Limestone and dolomite glades and rocky, open forests, thinly wooded bottoms along intermittent streams.

Identifying characters: Herbaceous annuals with repeatedly forked stems, up to 1 foot tall. **Leaves oppositely arranged**, without stalks, oblong with rounded tips, up to 2 inches long. Flowers in numerous clusters at stem tips, **corollas lilac, white or rose-purple with slender tubes to $\frac{3}{8}$ inch long**. Fruits oval, $\frac{1}{8}$ inch long, compressed, some with protruding ridge along side.

Causes for concern: The species is known from the Ozarks and the Ouachita Mountains of Missouri, Arkansas and Oklahoma. Populations may be lost to shading through canopy closure of formerly open forests and invasion of woody species on glades.

Note: This species is also shown on booklet cover.



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Missouri Rare Plant Reporting Form

Use this form if you believe you have located a site for a plant described in this booklet.

Observation Date: _____

Species (Scientific Name): _____

County: _____

Location (Township, Range, Section): _____

Topographic Quadrangle (if known): _____

Landowner (if known): _____

Describe how to reach location: _____

Description of habitat and surroundings ("word picture" of location, community type, habitat size, slope, topography, moisture relationships, etc.):

Number of plants seen: _____

In area of what size: _____

Number in bud: _____ In flower: _____ In fruit: _____

Sterile or immature: _____

Seedlings: _____

Condition of plants: _____

Comments on types of land use or signs of disturbance: _____

Investigator: _____

Investigator's Address: _____

Investigator's Phone: _____

(ATTACH ANY ADDITIONAL COMMENTS)

Attach a map showing the exact location of the plant/population.

Return to:
Botanist-Heritage
Natural History Division
Missouri Department of Conservation
P.O. Box 180
Jefferson City, Missouri 65102-0180
573/751-4115 ext. 3200



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